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## (54) Method and apparatus for performing electronic transactions

(57) A method for providing validated electronic commerce transactions is disclosed. A transaction order generated by a purchaser has a unique transaction identifier associated therewith and the purchase order is transmitted to a merchant and then to a transaction administrator. The transaction administrator contacts

the original purchaser and provides the generated unique transaction identifier to confirm whether or not the transaction order was initially provided by the purchaser. Upon verification of origination of the transaction order by the purchaser and other transaction information, the transaction administrator notifies the merchant and the transaction may be completed.

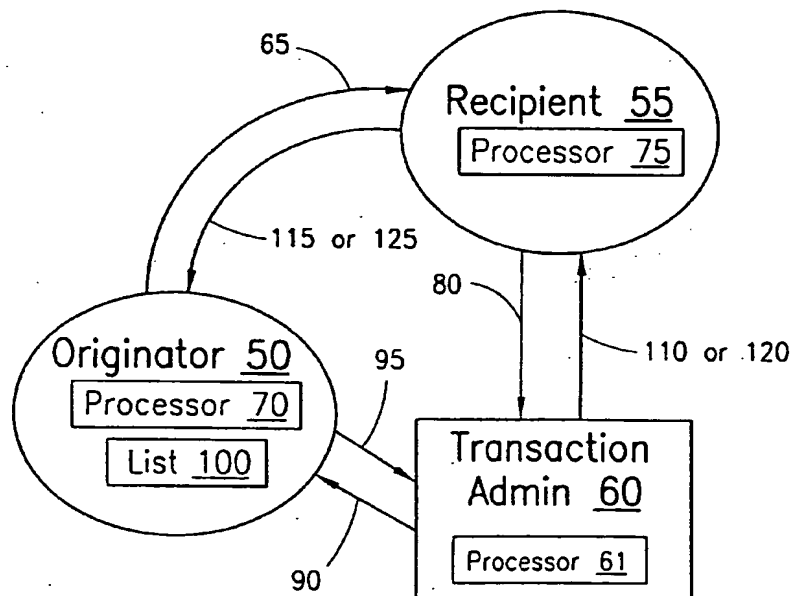


FIG. 3

## Description

**[0001]** The present invention related to electronic transaction, and more particularly, to a method and apparatus enabling validated electronic transactions between an originator, a recipient and a transaction administrator.

**[0002]** The increasing use of electronic media, such as the Internet, smart phones, screen phones and television with World Wide Web access, have expanded the opportunities for electronic commerce. In electronic transactions two or more entities electronically process specific tasks ranging from exchanging information, purchase and payment to real estate transactions. Financial examples of electronic transactions include purchase and payment transactions. Purchase transactions are performed using credit and debit cards. Payment transactions are performed in paying bills, sending refunds on return merchandise, sending awards, etc.

**[0003]** A common set-up for commercial (including electronic) transactions is illustrated in FIGURE 1. The transaction includes processing steps taking place between three entities, namely, a client 10, a merchant 20 and a payment authority (PA) 30. A delivery system between the client 10, merchant 20 and a PA 30 exists so that the steps required for transactions can be performed properly.

**[0004]** FIGURE 2 is a flow diagram generally illustrating the steps involved in a commercial transaction. In step 12, the client 10 places a purchase order to the merchant 20. The purchase order will include the item(s) the client desires to purchase and payment information on an account from which to purchase the item. This purchase order may be for goods, services or any other item normally involved in commercial transactions. When a purchase order is received by the merchant 20, the merchant sends at step 13 a request for payment authorization to the payment authority (PA) 30.

**[0005]** Inquiry step 14 determines whether or not the purchase is authorized at the PA 30. This step is performed by the processing equipment 35 associated with the PA 30. The PA 30 responds at step 15 with a confirmation and authorization for the payment amount once the payment information regarding the client 10 checks out. If the payment information is not confirmed with the PA 30, the PA transmits a rejection at step 16 for the requested purchase authorization transaction. Upon confirmation of the transaction, the merchandise is delivered to the client 10 at step 17. Upon rejection of the transaction, the merchant 20 notifies the client 10 of the denial of authorization by CCA 30 at step 18. The sequence of steps 12, 13, 14, 15, 16, 17 and 18 must occur within some type of traceable delivery system.

**[0006]** The delivery system between the client 10 and the merchant 20 can be a regular mail system, telephone system, computer network or any other delivery system like UPS or Federal Express. The delivery system between the client 10 and the merchant 20 must

also have some tracking capability. The delivery system between the merchant 20 and the CCA 30 is typically a private network providing Point-Of-Sale (POS) processing. All necessary information is transferred between two or more points in this network with a tracking mechanism that can follow the transactions. All of the above steps can also be executed within electronic transactions.

**[0007]** However, in electronic commerce it is not possible to properly authenticate entities and transactions. In order to properly authenticate entities such as a client 10 and the merchant 20 performing a transaction, there is proposed a standard SET (Secure Electronic Transactions) in which each entity obtains a Certificate of Authentication from a Certificate Authority (CA) whereby clients and merchants can authenticate each other before performing any transaction by digitally signing the contents of the transaction and having the digital signature authenticated by the CA. This open exchange of digital signatures increases the potential of fraud. Thus, there is also a need for secure electronic commerce where the exchange of digital signatures between entities is eliminated.

**[0008]** An unauthorized client can send in a purchase order with an address to which to deliver the goods and no proper tracking can be established to validate whether or not an authorized client has initiated the purchase order. The PA 30 cannot establish whether the request from merchant 20 is initiated by the true client 10 or an unauthorized client. It is possible that a purchase order was never actually generated by an authorized client 10 but by someone else at the merchant's place of business. Additionally, the amount of the authorization can be changed or inflated by the merchant 20 and thus become an invalid request. The PA 30 does not know the real amount requested by the authorized client 10 and does not have any mechanism to confirm this information. Finally, the delivery address could be different from the actual address of the client 10, and the true client would not receive the merchandise, just the bill. Furthermore, there is no tracking system for automatically validating electronic transactions. Because of these issues, electronic transactions are a risky proposition.

**[0009]** In today's electronic banking, payment transactions take place by sending payment requests to a bank or third party to create electronic checks. The bank then makes payment to the client's payee or third party then sends the electronic check to the client payee. However, since the client's name, bank A.B.A. number and account number are easily accessible, it is easy for an unknown third party to create fund transfers even though data can be exchanged securely between the client and the bank. Furthermore, electronic check processing still has to be carried out as shown in FIGURE 12 where PA 30 is a Banking System. Electronic commerce on the Internet is still a risky business because in the U.S. for example, the bank is liable for this kind of fraudulent transaction. There is therefore a need

to provide validated banking transactions over the Internet.

[0010] According to a first aspect of the invention there is provided a method of validating an electronic transaction between an originator and a recipient comprising the steps of: generating an electronic transaction, including a transaction identifier, at the originator; transmitting the transaction to the recipient; and communicating information between the originator and the transaction administrator to validate the transaction based on the transaction identifier.

[0011] The transaction may be transmitted from the recipient to the transaction administrator as part of a verifying step. The verifying step may include transmitting the transaction identifier from the recipient to the transaction administrator and authenticating the transaction identifier received by the recipient. The verifying step may include authenticating the transaction identifier received by the transaction administrator.

[0012] The information may be communicated between the originator and the transaction administrator after the transaction has been transmitted and a request for verification of the transaction may be transmitted from the transaction administrator to the originator.

[0013] A verification of the original transaction transmission may be transmitted from originator to transaction administrator.

[0014] The transaction identifier may be generated at the originator and transmitted from the transaction administrator to the originator as part of the verifying step, thereby enabling authentication of the transaction identifier to be performed at the originator.

[0015] The entire transaction may be transmitted from the transaction administrator to the originator as part of the verifying step, to enable authentication of the transaction to be performed at the originator.

[0016] Alternatively information may be communicated between the originator and the transaction administrator before the transaction has been transmitted, in which case the transaction identifier may be generated at the transaction administrator and transmitted to the originator for inclusion in the transaction. The transaction identifier may then be authenticated at the transaction administrator.

[0017] The transaction identifier may be a unique transaction identifier.

[0018] According to a second aspect of the invention there is provided a system for providing secure transactions between an originator and a recipient comprising: first processing means associated with the originator for generating an electronic transaction having a transaction identifier; second processing means associated with the recipient arranged to generate a verification request in response to receipt of the transaction for generating; third processing means associated with a transaction administrator for receiving the verification request from the recipient; and means to securely communicate information between the first processing means and the

third processing means to determine validity of the transaction based on the transaction identifier.

[0019] The second processing means may transmit the transaction to the third processing means as part of the verification request.

[0020] The first processing means may generate the transaction identifier associated with the transaction or in the alternative the third processing means may generate the transaction identifier associated with the transaction.

[0021] According to a third aspect of the invention there is provided a system administrator for managing transactions between an originator and a recipient comprising: means for receiving a verification request from a transaction recipient; and means for securely communicating information with a transaction originator to validate the transaction based on a transaction identifier included in the transaction.

[0022] According to a fourth aspect there is provided a method for providing a validated electronic transaction between an originator, a recipient and a transaction administrator, comprising the steps of: generating an electronic transaction including at least a unique transaction identifier associated therewith; transmitting the electronic transaction from the originator to the transaction administrator through the recipient; transmitting the electronic transaction from the transaction administrator to the originator for validation; validating the electronic transaction at the originator based on the unique transaction identifier; notifying the transaction administrator of a validation status of the electronic transaction based on the validation; and completing the electronic transaction based on the validation status.

[0023] According to a fifth aspect there is provided a method for providing a validated electronic transactions between an originator, a recipient and a transaction administrator, comprising the steps of: requesting an electronic transaction from the originator to the recipient, the electronic transaction including a unique transaction identifier, an originator identifier and transaction data; requesting validation of the originator identifier and the transaction data from the transaction administrator; requesting validation of the unique transaction identifier and the transaction data from the originator; completing the electronic transaction if the unique transaction identifier, the originator identifier and the transaction data are validated by both the originator and the transaction administrator.

[0024] According to a sixth aspect there is provided a method for providing electronic transactions comprising the steps of: transmitting a transaction from an originator to a recipient, said request including at least an originator identifier; transmitting a first verification request from the recipient to a transaction administrator to verify the originator identifier; verifying the identifier for the originator at the transaction administrator; transmitting a second verification request from the transaction administrator to the originator to determine if the originator

generated the transaction; verifying if the originator generated the transaction; and completing the transaction in response to answers on the first and the second verification requests.

**[0025]** According to a seventh aspect there is provided a method for providing electronic transactions comprising the steps of: transmitting a transaction from an originator to a recipient, the transaction including an originator identifier; associating a unique transaction identifier with the transaction; transmitting a first verification request including the unique transaction identifier from the recipient to a transaction administrator to verify the originator identifier; transmitting the unique transaction identifier from the transaction administrator to the originator; comparing the unique transaction identifier to other unique transaction identifiers generated by the originator to determine if the originator generated the unique transaction identifier; and completing the transaction if the originator generated the unique transaction identifier.

**[0026]** According to an eighth aspect there is provided a method for providing electronic transactions over a computer network between an interconnected originator, recipient, and a transaction administrator, comprising the steps of: generating a first e-mail message from the originator to the recipient containing a transaction, the transaction containing a unique transaction identifier, an originator identifier and transaction data; generating in response to the first e-mail message a second e-mail message from the recipient to the transaction administrator requesting validation of the originator identifier, the second e-mail message including the unique transaction identifier and the originator identifier; generating in response to the second e-mail message a third e-mail message from the transaction administrator to the originator requesting validation of the unique transaction identifier, the third e-mail message including the unique transaction identifier; comparing the unique transaction number from the third e-mail message to other unique transaction numbers generated by the originator to determine if the originator generated the transaction; and completing the transaction based upon the results of the comparison.

**[0027]** According to a ninth aspect there is provided a method for transmitting information between an originator, a recipient and a transaction administrator, comprising the steps of: associating the information with a unique transaction identifier and an originator identifier; transmitting an information request from the originator to the recipient; requesting validation of the originator identifier from a transaction administrator; validating the originator identifier at the transaction administrator; requesting validation of the unique transaction identifier associated with the information from the originator; validating the unique transaction identifier at the originator; notifying the transaction administrator of a validation status of the information based on the validation; and transferring the requested information upon validation

by the originator and the transaction administrator.

**[0028]** According to a tenth aspect there is provided a system from providing secure electronic transactions between an originator, a recipient and a transaction administrator, comprising: first processing means associated with the originator for generating an electronic transaction having a unique transaction identifier and an originator identifier, associated therewith; second processing means associated with the recipient responsive to the originator for generating validation requests on the originator identifier to the transaction administrator;

third processing means associated with the transaction administrator for forwarding the unique transaction identifier to the originator to determine the validity of the electronic transaction and fourth processing means for comparing a unique transaction identifier received from the transaction administration to the unique transaction identifier generated by the second processing means to determine the validity of the transaction.

**[0029]** According to an eleventh aspect there is provided a method for enabling electronic transactions between a first party, a second party and a transaction administrator, comprising the steps of: generating a request for processing of an electronic transaction; associating a unique transaction identifier with the electronic transaction, the unique transaction identifier indicating a valid transaction; determining the validity of the electronic commerce transaction by comparison of the unique transaction identifier with a list of valid unique transaction identifiers; and completing the electronic commerce transaction based upon the results of the determination of the validity of the unique transaction identifier.

**[0030]** According to a twelfth aspect of the invention there is provided a method of validating an electronic transaction between an originator and a recipient comprising the steps of: generating an electronic transaction at the originator; transmitting the transaction to the recipient; verifying the transaction; and communicating information between the originator and the transaction administrator to validate the transaction.

**[0031]** The present invention overcomes the foregoing and other problems with a method and apparatus enabling verification and validation of original "electronic transaction" between one or more originators, recipients, and transaction administrators (TA). The originator is a party who originates the transaction, for example for exchanging information documents or for initiating a payment via an electronic check or a payment transaction for goods and services from the recipient. The originator is synonymous with "client", "purchaser", "user", "requestor" and "account holder". The recipient is the entity receiving for example the information document or payment for a provided service such as a utility bill or a merchant who provides goods and services. Recipient is synonymous with "merchant", "service provider", "vendor" and "payee". The transaction administrator

(TA) is an entity which authenticates entities and validates the content of the transaction by the originator. Transaction administrator is synonymous with "Credit Card Authority (CAA)", "Government Authority", "Financial Network", or "Banking system (BS)".

**[0032]** A validated transaction is a transaction in which the TA validated the entities, facilitates the transaction and/or validates the contents of the transaction by the originator. In a validated electronic transaction, either the client, merchant or transaction administrator can initiate the transaction. In other transaction, the client may initiate a transaction, for example requesting particular items of merchandise or services from a merchant via the Internet, a dial-up-network, or any suitable network. The electronic transaction includes details of the transaction such as descriptions of the item(s) that the client desires to purchase, credit card or check payment information, information on other types of payment by means of which the item(s) will be purchased, and a transaction identifier that has been generated by the originator and is uniquely associated with the particular purchase transaction.

**[0033]** This information is transmitted to the merchant over the network. In response to e.g. a purchase order, the merchant generates a payment authorization request for transmission to the TA. The payment authorization request will have attached to it the transaction identifier initially provided by the client along with transaction information. Upon receipt of the payment authorization request the TA will validate the client and the merchant using the information provided. The TA then generates a validation request to the client that includes the transaction identifier. This communication between the TA and the client may be encrypted using a suitable encryption method or a set of virtual keys known only to the TA and each individual purchaser.

**[0034]** Upon receipt of the validation request, the client decodes, if necessary, the encrypted validation request and extracts the transaction identifier therefrom. The identifier is compared to a listing of generated transaction identifiers at the client to confirm that the client authorized the transaction order with which the transaction identifier is associated. Confirmation or denial of the validation is transmitted back to the TA by the originator. This confirmation may be encrypted using a suitable encryption method, if necessary. To provide additional security, a query or group of queries may be included within the validation requests between the TA and the originator. These queries are randomly generated and directed to information known solely by the originator, such as mother's maiden name, social security number, driver's license number, birth date, etc. Upon receipt of validation or non-validation from the originator, the TA confirms or aborts the transaction by notifying the recipient whether or not the transaction is valid based upon the originator's validation response and the accuracy of the information contained in the transaction request. If the information in the transaction request checks out,

the item(s) ordered may be delivered to the originator by the recipient. The delivery and communication systems between the client, merchant and TA preferably consists of some type of computer network such as the Internet, private Intranet or any suitable network.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0035]** For a more complete understanding of the present invention, reference is made to the following detailed description taken in conjunction with the accompanying drawings wherein:

FIGURE 1 is a diagram of a commercial transaction between a client, merchant and credit card authority;

FIGURE 2 is a flow diagram describing the transaction of FIGURE 1;

FIGURE 3 is a diagram of a validated commercial transaction using the present invention between an originator, a recipient and a transaction administrator;

FIGURE 4 is a flow diagram describing the transaction of FIGURE 3;

FIGURE 5 is a diagram of an electronic commerce transaction using a credit card according to the method of the present invention;

FIGURE 6 is a flow diagram describing the transaction of FIGURE 5;

FIGURE 7 is a diagram of an electronic commerce transaction according to an alternative embodiment of the method of the present invention;

FIGURE 8 is a flow diagram describing the transaction of FIGURE 7;

FIGURE 9 is a diagram of an electronic commerce banking transaction to a payee for goods and services according to the method of the present invention;

FIGURE 10 is a flow diagram describing the transaction of FIGURE 9;

FIGURE 11 is an illustration of an e-mail control system architecture enabling electronic commerce transactions according to the present invention;

FIGURE 12 is an illustration of an e-mail record stored within an e-mail database;

FIGURE 13 is a flow diagram of a "send" mail action of an electronic commerce transaction using an e-mail delivery system;

FIGURE 14 is a flow diagram of a "receive" mail action of an electronic commerce transaction using an e-mail delivery system;

FIGURE 15 is an illustration of an electronic transaction between an originator, recipient and transaction administrator using an e-mail delivery system; and

FIGURE 16 is an illustration of an originator and a recipient exchanging information documents via an e-mail delivery system where the originator, the re-

recipient and the information documents are validated directly by the transaction administrator.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0036]** Referring now to drawings and more particularly to FIGURES 3 and 4, there is illustrated a system and method for improved electronic transactions. An originator 50 initiates a transaction at step 65 using processor 70. The transaction may comprise a purchase, payment or request for an information document from recipient 55. The transaction request includes a unique transaction identifier (UTID) associated with the specific transaction request and originator identity (OID) to identify the originator 50 to a transaction administrator 60. The originator identity may comprise a credit card number, account number, etc.

**[0037]** The processor 70 referenced above is any suitable processor capable of handling transaction processing systems such as a personal computer (e.g. PC, Mac, Hand held PC), a point of sales (POS) device, a POS device with a Smart Card, a work station, a server or any other suitable hardware/software combination. The merchant 55 and TA 60 also include suitable processors at their facilities to run the electronic commerce transaction.

**[0038]** Recipient 55 first reviews the transaction request using a processor 75 and generates a request for authentication of the originator 50 using the OID, UTID and the information content of the transaction request such as an amount or document name at step 80 to the transaction administrator. The transaction administrator 60 first validates the identity of recipient 55 and then the OID at step 85. If the OID is invalid, the transaction administrator 60 notifies the recipient 55 of the invalidity and the transaction is denied. If the OID is valid, the transaction administrator 60 determines the originator associated with the OID, transmits the transaction request and associated data to the originator 50 and requests that the originator validate the transaction request containing the UTID at step 90. The transaction administrator 60 may also validate transaction amounts and credit limits at this time or upon receiving a response for the originator 50.

**[0039]** The originator 50 validates the transaction by comparing at step 95 the UTID with a list 100 generated by the processor 70 of the originator listing the UTID associated with each transaction generated by the originator and notifying the transaction administrator 60 of the results. The list 100 also includes the details of the transaction (amount, parties, etc.) associated with the UTID which must also be validated by the originator 50. The transaction is granted or rejected by the transaction administrator 60 based on the comparison results at step 105. If the originator 50 does not validate the transaction at step 95, the transaction administrator 60 rejects the transaction at step 110 which invalidates the transaction. The originator is notified at step 115 of the

invalidation of the transaction. Upon receipt of the transaction validation status from the originator 50, the transaction administrator 60 validates the originator 50 and the transaction request at step 120, and notifies the recipient 55. The originator 50 and recipient 55 then complete the transaction at step 125.

**[0040]** Validation of the originator 50, recipient 55 and transaction administrator 60 may be validated by the use of digital signatures transmitted along with the various transmissions between parties in a known manner. Additionally, the identity of the originator 50 may be validated by requiring the originator to answer a series of questions that only the originator would know, such as mother's maiden name, social security number, etc. This configuration may be used to carry out a variety of different types of electronic commerce transactions. For example, if the originator 50 requests a document, the recipients 55 can send the document to the originator 50. An originator may also pay bills or purchase merchandise. There are several variations of this embodiment in which a transaction administrator 60, originator 50 and recipient 55, can initiate transactions and several, but not all, of these variations are illustrated in the following examples.

**[0041]** For purposes of discussion, entities and components related to those disclosed in the embodiment described in FIGURES 3 and 4 will be given similar reference numbers in the remainder of the FIGURES. Referring now to FIGURES 5 and 6, these are illustrated diagrams for a particular embodiment of the invention for a credit card transaction between a client 50, merchant 55 and credit authority (CA) 60. A client 50 places a purchase order to the merchant 55 at step 150. The purchase order is generated by an electronic transaction processor 70 associated with the client 50. The purchase order includes a UTID 60 generated by the processor 70 that is uniquely associated with the transaction, an amount and a credit card number. Once the purchase order is received, the merchant 55 transmits at step 155 a request for payment authorization to the CA 60 over the Internet or a private network. Along with the confirmation request, the merchant 55 transmits the UTID, credit card number and data concerning the purchase order to the CA 60.

**[0042]** Upon receipt of the payment authorization request from the merchant 55, a CA processor 61 determines if the purchase order is authorized at step 160 by attending to the validity of the credit card number, merchant, amount of purchase, etc., and determine the client identity. The CA 60 transmits at step 165, the purchase order and the associated UTID 60 and purchase order data to the client processor 70. The UTID 60 and purchase order data are processed at the client 50 to determine if they are valid. The transmission from the CA 60 to the client 50 may be encoded using some type of virtual encryption key or any suitable encryption technology. The client processor 70 decodes the transmission (if encrypted) using knowledge of the virtual encryp-

tion key method between the client 50 and the CA 60 and compares the received unique transaction identifier to a unique transaction identifier list 100 of identifiers transmitted from the client at step 170 to determine whether to validate the transaction. The results of the validation is then forwarded to the CA 60. If the UTID 60 matches an entry within the client list 100 and the purchase order data checks out with what the client 50 expects, the requested transaction is identified as valid. If no match for the UTID is found or if the purchase order data is incorrect the requested transaction is identified as invalid or fraudulent.

**[0043]** As an additional protection, the CA 60 may query the client processor 70 for various items of information that only the client 50 would know, such as mother's maiden name, driver's license number, etc. This query may be constantly changed, such that an unauthorized user would not be able to predict what information the CA 60 might ask for. Additionally, digital signatures may be used to help identify parties.

**[0044]** The CA 60 responds at step 180, with an authorization for the transaction if the client 50 transaction and credit limit have been approved by the CA processor 61 and if there is a confirmation by client 10 of transaction validity. If the transaction is not validated by either the CA 60 or client 50, the CA transmits a rejection of the requested transaction to the merchant at step 185, and the client is notified by the merchant of the rejection at step 190. Upon confirmation of the purchase order, the merchandise may be delivered to the client 50 and a credit card transaction can be completed between client 50 and merchant 55 at step 195. Communication between the client 50 and the CA 60 guarantees that an unauthorized purchase order is not issued by an unauthorized client or merchant 55 and that a merchant does not change the amount on the purchase order issued by the client. Furthermore, the delivery address may be confirmed by the client 50 prior to receipt of the goods. The use of the UTID in all communications between the client 50, merchant 55 and the CA 60, and the verification and validation of the purchase order by the client reduces fraudulent transactions. The system provides a mechanism for consumers to ensure the validity of transactions and thus enhances the overall security of electronic commerce. The UTID ties together all three delivery systems. The virtual keys used in communications between client 50 and the CA 60 not only prohibits unauthorized clients from performing a transaction but verifies that the current transaction has been initiated from the true client.

**[0045]** In an alternative embodiment parties other than the originator 50 may create the UTID, for example the TA 60. A system and method for this type of transaction are illustrated in FIGURES 7 and 8. Initially, client 50 generates at processor 70, a credit authorization request including an originator identifier and relevant information to credit authority (CA) 60 at step 200. The CA 60 processes the credit request to determine the va-

lidity of the client 50 requesting credit based on the originator identifier and the associated amount at step 205. The CA 60 then sends the credit transaction information along with an associated UTID or a rejection of authorization back to client 50 at step 210. Upon receipt of credit approval and the UTID, the client 50, transmits a purchase request with the provided UTID to the merchant 55 at step 215. The merchant 55 sends a request for transaction validation of the UTID to the CA 60 at step 218. The CA 60 compares the transaction information, including UTID, with the original credit transaction and UTID in a list 100 of credit transactions and associated UTIDs generated by the CA and responds to the merchant 60 regarding the validity of the transaction at step 220. The comparison at the CA 60 uses a processor 61. The list 100 comprises credit transactions and associated UTIDs created by the processor 61. The merchant 55 accepts or rejects the transaction at step 225 based on the comparison performed at step 220 by the CA 60. If the merchant 55 accepts the transaction at step 225, the order is provided to the client 50 at step 230. If the merchant 55 rejects the transaction at step 225, it notifies the client 50 of the rejection at step 235. Each transaction is tracked by a corresponding UTID, and is verified by the CA 60 with reference to the originator 50 and the issuance of the UTID.

**[0046]** FIGURES 9 and 10 illustrate another example of the proposed method and apparatus to enable validated banking transactions, between an account holder or client 50 and any third party payee 55. This time a validation is performed between the client 50 and a client bank 250 in the banking system 60 to guarantee that a valid client 50 requested a payment transaction. Initially, a client 50 initiates a payment transaction to the payee 55 at step 255 in the form of, for example, an electronic check. The electronic check includes a UTID and associated electronic check information such as amount, account number, etc. In response to the electronic check, the payee 55 requests payment of the electronic check from the banking system 60 or deposits the electronic check into payee bank 260 at step 265. Upon receipt of the request or deposit, the payee bank 260 in conjunction with the client bank 250 in the banking system 60 determines the validity of the electronic check including bank number, fund availability, account number, etc. at step 270 and identifies the associated client or account holder 50 that initiated the transaction.

**[0047]** The banking system 60 then sends the electronic check along with the associated UTID to the client 50 for validation at step 275. The client 50 compares the information on the transaction with the original payment transactions and associated UTIDs and other relevant payment information at step 280 from a list 100. The list 100 will include all original electronic check transactions and the related information and UTIDs generated by the client 50. The client 50 then notifies the client bank 250 in the banking system 60 with a verdict on the validity of the transaction. Based on the validity determination pro-

vided by the client 50 and the client bank's 250 validity checks, the payee bank 260/banking system 60 grants or rejects the payment transaction at step 285. If the banking system 60 approves the payment transaction request at step 91, the payment transaction is then completed at step 290 by transferring funds to the proper accounts. If the transaction is rejected at step 93, the banking system 60 notifies the client 50 and the payee 55 of the rejection of the electronic check payment transaction at step 295.

**[0048]** Generally, the payee 55 deposits the electronic check in his/her account at payee bank 260 within the banking system 60. The payee bank 260 confirms the client's identity, account number and relevant information. The payee bank 260 next sends the electronic check for the payment to the client bank 250 of the client 50 via check clearing house (CCH) 299. Check clearing house 299 debits client's bank account and credits payee's bank account subject to client's bank validation of checks received from the payee 55. When the client's bank 250 receives an electronic check from the Check Clearing House 299 it validates the check (authenticates the check with the client 50 signature and available funds in the client's account). If the client's bank 250 does not validate the check, it rejects the check for the payment, and the check clearing house 299 reverses the transaction and notifies the payee bank 260. The payee's bank 260 then notifies the payee 55 that the check is "bounced" or returned back for insufficient amount or whatever else is the cause. All these processing steps may be performed in electronic transactions.

**[0049]** The communications between the originator 50 and TA 60 or between the recipient 55 and the TA 60 can be established with any traceable delivery system, such as a point-to-point tunneling protocol (PPTP) which is equivalent to a telephone virtual circuit. However, an e-mail system also provides a traceable delivery system in an alternative embodiment an e-mail delivery system may be used not only to exchange information, but to process complex transactions and safely share information between multiple entities. Referring now to FIGURE 11, there is illustrated an e-mail control system (ECS) 300 enabling electronic commerce transactions on the Internet between an originator 50, recipient 55, and transaction administrator 60. The system guarantees the validity of the electronic commerce transaction by validating that the client owning a presented credit card number, unique transaction identifier, transaction amount, etc., has initiated the transaction. There exists a traceable delivery system on computer networks such as the Internet, Intranet or private network, namely e-mail. An existing e-mail system may be extended so that an originator 50 can openly use payment numbers, such as credit card numbers and account numbers, over the Internet. The terms E-mail and e-mail are synonymous. In this example an ECS 300 interfaces with an e-mail delivery system 305 using the SMTP protocol to send mail and the POP3 protocol to

receive mail. The ECS 300 enforces the new behavior of the e-mail delivery system 305 to perform transactions between the originator 50, the recipient 55 and the transaction administrator 60. The ECS 300 may be implemented in single or multiple processors wherein separate processors control transaction e-mails and normal e-mails.

**[0050]** The ECS 300 uses the e-mail delivery system 305 (or suitable applications or functions) in conjunction with a mailbox database 315 to create, reply to or view e-mail messages. The ECS 300 sends and receives e-mail messages to/from the e-mail delivery system 305 using send mail 310 and receive mail 320 actions/functions of the e-mail system. The ECS 300 includes information such as UTID, OID and transaction data within a transaction e-mail and enables extraction of this information at a receiving part for further transaction processing such as validation. The mailbox database 315 includes a plurality of e-mail records 330, each having a unique transaction identifier 331 (FIGURE 12) associated therewith that has been generated by the e-mail control system 300.

**[0051]** A format of an e-mail record 330 is more fully described in FIGURE 12 wherein there is shown an e-mail record 330 including the unique transaction identifier or message ID 331; a mail type identification 335 indicating whether the record is to be transmitted, was just received, has already been transmitted, or comprise a transaction e-mail; the recipient's address 340; the subject matter of the e-mail 345; and the contents of the e-mail 348. For simplicity, the mail type identification 335 identifies the state of the e-mail record as it relates to the state of the e-mail delivery system 305. For example, when a user creates an e-mail record, the ECS 300 deposits this e-mail record into the mailbox database 315 with mail "type" equal to 1 indicating that the e-mail record is ready to be delivered to the recipients. The recipient address 340, subject matter 345 and contents 348 provide routing and content information to the e-mail delivery system 305.

**[0052]** When e-mail messages are utilized to provide electronic commerce transactions various parts of the e-mail record 330 will have a specific format to enable identification of an electronic commerce transaction and extraction of relevant data from the e-mail record. For example, when an electronic check is used, the subject 345 of the e-mail message may be formatted to read in one of the following manners to enable recognition by the e-mail control system 300:

1. "CheckNumber" - identifies a transaction e-mail requesting an electronic commerce transaction by the originator to the recipient.
2. "Val:#CheckNumber" - identifies validation requests from the transaction administrator to the originator.



3. "Re:#CheckNumber" - identifies a reply from the transaction administrator to the recipient.

4. "ACK:#CheckNumber" - identifies positive validation from the originator.

5. "NACK:#CheckNumber[code]" - identifies a negative validation and a code indicating the reason for the negative validation from the originator.

**[0053]** In the case of an electronic check transaction, the mail contents 348 of the e-mail may comprise a number of items, depending on who the e-mail is from, and the data required to be extracted by the e-mail control system 300 of the receiving party. A transaction request from the originator 50 may include an account number, amount of the transaction, account reference, transaction reference, and originator's personal information. A response from a recipient 55 may include account number information, account references, transaction references, and recipient's personal information. An e-mail message from the transaction administrator 60 may contain query information for the originator to obtain validation.

**[0054]** There may be several variations of this mail content 348 information. For example, a party may use the message I.D. field of the e-mail services delivery system 305 to create a unique transaction identifier. This message I.D. field may act as a UTID and identify a transaction type. For example, a message I.D. type of the form #[TYPE][UNIQUE SEQUENCE NUMBER][ORIGINATOR E-MAIL ADDRESS] identifies the type of transaction, a unique sequence number generated by the e-mail control system 300 and the originator's e-mail address. In the case of a check transaction, the UTID would appear as follows:

#c0000001originator@joe.doe

#c0000002originatorat@joe.doe.

This information would notify the ECS 300 how a transaction was to be processed.

**[0055]** The subject field may contain a transaction data identifier, such as a purchase order number of the originator 50, and an invoice number of the recipient 55 such that the transaction can be related to a prior transaction or another message processing system processing the transaction data. For example, upon successful transfer of fund deposits from a transaction administrator, the recipient can use an invoice number to credit the originator's account.

**[0056]** As noted above, the ECS 300 sends and receives e-mail via send 310 and receive 320 mail actions defined within the e-mail system. When a user selects an action from the user interface (not shown), preferably by pointing and clicking on the icon identifying the action, the ECS 300 executes the action. A send mail action 310 sends all e-mail marked "Type 1" to the e-mail delivery system 305 via an SMTP interface and a receive mail action 320 receives all new mail from the e-

mail delivery system 305 using a POP3 or similar interface. When the ECS 300 receives a new e-mail message, it loads the e-mail message into the mailbox database 315 as an e-mail record 330 and notifies the client 50. If the client 50 has any new mail and selects a "view new mail" action, the ECS 300 starts the "display mail" using a graphical user interface to display the new mail.

**[0057]** FIGURES 13 and 14 describe the Send 310 and Receive 320 3-mail actions, respectively, of the e-mail control system 300 shown in FIGURE 11. The send mail action 310 first checks if an e-mail record 330 contains a transaction at inquiry step 350. If a transaction is indicated, a series of tasks are performed at step 355. Initially a UTID is created. A delivery timer is initiated and the e-mail is marked for delivery. The e-mail record 330 is then loaded into the mail box database 315. The e-mail record is then ready for delivery to the recipient at step 360. Inquiry step 365 determines whether or not the delivery was a success. If so, the e-mail record is marked as delivered to the mail box database 315 at step 370 and the procedure is completed. Otherwise, no indication of delivery is provided.

**[0058]** The receive e-mail action 320 gets new e-mail from the e-mail delivery system 305 at step 375 and determines if the e-mail comprises transaction mail at step 380. If the e-mail comprises transaction mail, then the receive mail action 320 creates a proper reply with an attached UTID at step 385 and places the reply into the mail box database 315 for delivery at step 390. If the e-mail does not comprise transaction mail, the e-mail is placed directly in the mail box database 315 at step 395. These two actions allow the e-mail control system to properly process e-mail transactions to enable electronic commerce.

**[0059]** Referring now also to FIGURE 15, there is illustrated an application of the present invention whereby an electronic commerce transaction may occur between a client 50, a merchant 55 and a CA 60 utilizing an e-mail delivery system 305 to enable confirmation of the validity of the transaction. As discussed previously, the client 50 generates a purchase order which is formatted and transmitted to the merchant 55 via an e-mail message at 400. The ECS 300 causes the unique transaction identifier to be generated and attached to the e-mail message record 330 from the client 50 and formats transaction data within the message. The e-mail record 330 may be of the form of the records discussed previously. The merchant 55 receives and processes this e-mail message to extract relevant data and generates another e-mail message at 405 to the CA 60 requesting verification and authorization of the charge amount and the credit card number provided by the client 50. This e-mail message is also formatted by the ECS 300 to include the UTID and relevant transaction data initially transmitted by the client 50.

**[0060]** The CA 60 formats and generates yet another e-mail message which may be encoded using some

type of virtual key encryption (or other type of encryption) for transmission to the client 50 at 410. Included within the e-mail message by the ECS 300 are the unique transaction identifier; purchase order data such as item, amount and delivery address; and optionally randomly generated questions on which only the client 50 has knowledge, such as birth date, mother's maiden name, social security number, etc. The client 50 utilizing its knowledge of the virtual key decrypts the e-mail message, extracts the relevant transaction data and compares the UTID provided in the e-mail message to the unique transaction identifier list 100 at the client 50 to determine whether or not the requested transaction has been initiated by the client.

**[0061]** If a match on the list 100 is found, the purchase order data is checked against the transaction data associated with the match. If the data matches, the client 50 generates an e-mail message to the CCA at 415 indicating that the requested transaction originated with the client (transaction valid) and provides responses to the random questions generated by the CA 60. This e-mail message could be encrypted if the client 50 so desires.

**[0062]** The CA 60, upon confirmation of the answer to the random questions and verification of the transaction by the client, transmits an e-mail message to the merchant 55 at 420 enabling delivery of the requested merchandise or services to the client at 425. If the transaction is not validated by either the client 50 or the credit authority 60 due to an improper UTID, improper query response or lack of authorization for the claimed credit limit amounts by the credit card authority, completion of the transaction is denied at 420 in an e-mail message.

**[0063]** Each of the e-mail messages transmitted by the e-mail delivery system 305 are responsive to queries to the e-mail control system 300 generated by a transaction request. The transaction request causes the e-mail control system 300 to generate the e-mail record 330 having the unique global transaction identifier or message identifier 331, a mail type identification 335 indicating a transaction, and the mail content 348, including all information necessary to perform the validation and authorization procedures at the credit authorities or transaction administrator and the transaction originating party.

**[0064]** Referring now to FIGURE 16, there is illustrated an exchange of information between an originator 50 and a recipient 55 using an e-mail delivery system 305. Information is synonymous with document, software, classified data, transaction data or a database query and responses. The invention provides a method to securely exchange and process information between originator 50 and recipient 55, where an originator and recipient can be client or server on the Internet/Intranet or private network. Please note that currently, it is not possible to perform transaction processing between two clients on the Internet or Intranet. The present invention not only provides a method to perform transaction

processing between two clients but also creates an automated secure information exchange firewall. While the following is described with respect to an e-mail delivery system it should be realized that any type of delivery system would be useful. The originator 50 sends a document including a UTID and originator identifier (OID) to recipient 55 within an e-mail message at 430. Upon receipt of the e-mail message, the recipient 55 forwards another e-mail message to the transaction administrator (TA) 60 at 435. The e-mail message includes the OID, UTID and document name. The TA 60 authenticates the OID of originator so a message can be transmitted to the originator. If OID does not authorize, the TA 60 sends a negative response to recipient 55 at 450. Otherwise, the TA 60 requests originator 50 to validate the transaction via another e-mail message at 440. The e-mail message includes the UTID.

**[0065]** The originator 50 validates transactions by comparing UTID with a list 100, including UTIDs generated by the originator along with associated information. The originator 50 sends a negative acknowledgment due to failure to match a UTID or associated information if the transaction is invalid or a positive acknowledgment if the transaction is valid and the UTID and associated information matches at 445. The TA 60 upon receipt of a positive or negative validation of the transaction with the associated UTID notifies the recipient of a positive status at 450.

**[0066]** The originator and the recipient then completes the information transaction at 455. For example, if recipient receives a positive acknowledgment for transaction, it accepts the information. Since the OID is authenticated by the TA 60, the recipient 55 is guaranteed that the information is received from the desired originator. In this example, since the originator 50 has validated the transaction and information, the originator is guaranteed that recipient 55 has received the information. The transaction administrator 60 may be any entity, such as a Government authority, U.S. Post Office, etc.

**[0067]** Following is an example, according to Figure 16, of a client to client information exchange where the information comprises transaction data processing. In this example, an originator 50 sends an e-mail containing transaction data including SQL statements asking for database records from the recipient 55. Upon receiving an e-mail from the originator 50 recipient 55 sends an e-mail containing relevant data to the TA 60 to validate the transaction. The TA 60 validates the recipient 55 and originator 50. The TA 60 then sends a validation request via e-mail to the originator 50. The originator 50 validates the transaction by comparing UTID and transaction contents with the list 75 of transactions and responds to, TA 60 regarding the validity of the transaction. TA 60 validates the transaction based on the response from the originator and notifies recipient 55 regarding the validity of the transaction.

**[0068]** If the transaction is valid, recipient processes

the transaction data request using processor 75 (or another associated processor) and formats the data into an e-mail or sends the transaction data request to another processor (not shown) which processes the request and returns the transaction data into an e-mail for transmission to the originator 50. Requested information could be formatted into an ASCII document or an ASCII title with suitable delineation for data separation or into an Internet browser HTML document. When the originator 50 receives transaction data from the recipient 55, it then displays or processes the data.

**[0069]** Although preferred embodiments of the method and apparatus of the present invention have been illustrated in the accompanying Drawings and are described in the foregoing Detailed Description, it is understood that the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications, and substitutions without departing from the spirit of the invention as set forth and defined by the following claims.

#### Claims

1. A method of validating an electronic transaction between an originator and a recipient comprising the steps of:

generating an electronic transaction, including a transaction identifier, at the originator;  
transmitting the transaction to the recipient; and  
communicating information between the originator and the transaction administrator to validate the transaction based on the transaction identifier.

2. A method as claimed in claim 1 including verifying the transaction at a transaction administrator;

3. A method as claimed in claim 2 including transmitting the transaction from the recipient to the transaction administrator as part of the verifying step.

4. A method as claimed in claim 3 wherein the verifying step includes transmitting the transaction identifier from the recipient to the transaction administrator.

5. A method as claimed in claim 3 or 4 wherein the verifying step includes authenticating the transaction identifier received by the recipient.

6. A method as claimed in claims 4 or 5 wherein the verifying step includes authenticating the transaction identifier received by the transaction administrator.

7. A method as claimed in any preceding claim comprising communicating information between the originator and the transaction administrator after the transaction has been transmitted.

8. A method as claimed in claim 7 wherein communicating information comprises transmitting a request for verification of the transaction from the transaction administrator to the originator.

9. A method as claimed in claim 8 wherein communicating information further comprising transmitting a verification of the original transaction transmission from originator to transaction administrator.

10. A method as claimed in any of claims 3 to 9 comprising generating the transaction identifier at the originator.

11. A method as claimed in claim 10 including transmitting the transaction identifier from the transaction administrator to the originator as part of the verifying step.

12. A method as claimed in claim 11 including authenticating the transaction identifier at the originator.

13. A method as claimed in any of claims 2 to 12 including transmitting the transaction from the transaction administrator to the originator as part of the verifying step.

14. A method as claimed in claims 1 to 6 comprising communicating information between the originator and the transaction administrator before the transaction has been transmitted.

15. A method as claimed in claim comprising generating the transaction identifier at the transaction administrator and transmitting the transaction identifier to the originator for inclusion in the transaction.

16. A method as claimed in claim 15 including authenticating the transaction identifier at the transaction administrator.

17. A method as claimed in claims 3 to 16 where the transaction identifier is a unique transaction identifier.

18. A method as claimed in any of claims 2 to 17 including generating an originator identification and including the originator identification in the transaction.

19. A method as claimed in claim 18 including authenticating the originator identifier received by the

recipient.

20. A method as claimed in claim 19 including authenticating the originator identifier at the transaction administrator. 5
21. A method as claimed in any of claims 2 to 20 including generating a recipient identifier and authenticating the recipient identifier at the transaction administrator. 10
22. A method as claimed in any of claims 2 to 21 including transaction data in the transaction. 15
23. A method as claimed in claim 22 including authenticating the transaction data received by the recipient. 20
24. A method as claimed in claim 24, in so far as dependent on claim 7, including authenticating the transaction data at the originator. 25
25. A method as claimed in claim 24, in so far as dependent on claim 12, wherein transaction data is associated with a transaction identifier at the originator, and both the transaction data and the transaction identifier are included in the transaction. 30
26. A method as claimed in claim 25 comprising comparing the transaction data and the transaction identifier received from the transaction administrator with a list of all transaction identifiers and associated transaction data held at the originator. 35
27. A method as claimed in any preceding claim wherein the transaction is transmitted via e-mail messages over a computer network. 40
28. A method as claimed in any preceding claim in which the communication between the originator and the transaction administrator takes the form of randomly generated questions of which only the originator has knowledge. 45
30. A method as claimed in any preceding claim including encrypting the communication between the originator and the identifier. 50
31. A method as claimed in any preceding claim comprising completing the transaction in response to a positive validation of the transaction by the transaction administrator. 55
32. A method as claimed in claim 30 including, in the completing step, transmitting a positive validation indicator to the recipient and subsequently completing the transaction between the originator and the recipient.

33. A method as claimed in claims 29 or 30, in so far as dependent on claims 3, 15 and 22, including completing the transaction if the transaction identifier, the originator identifier and the transaction data are verified by the transaction administrator.

34. A system for providing secure transactions between an originator and a recipient comprising:

first processing means associated with the originator for generating an electronic transaction having a transaction identifier;  
second processing means associated with the recipient arranged to generate a verification request in response to receipt of the transaction for generating;  
third processing means associated with a transaction administrator for receiving the verification request from the recipient; and  
means to securely communicate information between the first processing means and the third processing means to determine validity of the transaction based on the transaction identifier.

35. A system as claimed in claim 34 wherein the second processing means transmits the transaction to the third processing means as part of the verification request.

36. A system as claimed in claim 34 or 35 wherein the first processing means generates the transaction identifier associated with the transaction.

37. A system as claimed in claim 34 or 35 wherein the third processing means generates the transaction identifier associated with the transaction.

38. A system as claimed in any of claims 34 to 37 including a delivery system interconnecting the first, second and third processing means.

39. A system as claimed in claim 38 wherein the delivery system is a computer network.

40. A system as claimed in claim 39 where the computer network is the Internet.

41. A system as claimed in any of claims 34 to 39 wherein the transaction and/or the verification request and/or the information is transmitted by an e-mail system.

42. A system as claimed in any of claims 34 to 41 wherein the transaction and/or the verification request and/or the information are encrypted.

43. A system as claimed in any of claims 34 to 41

wherein the third processing means generates random questions, of which only the originator has knowledge.

44. A systems as claimed in any of claims 41 to 43 5  
wherein means for automatically removing the transaction identifier is provided in at least one processor.

45. A system as claimed in any of claims 34 to 44 10  
wherein means for comparing the transaction identifier inserted into the transaction and the transaction identifier as received by the transaction administrator are provided.

46. A system as claimed in claim 45 wherein the 15  
comparing means is incorporated within at least one of the processors and performs the comparison automatically.

47. A system as claimed in any of claims 34 to 46 20  
wherein the third processing means authenticates the originator from an originator identifier associated with the transaction.

48. A system as claimed in any of claims 34 to 47 25  
wherein the third processing means authenticates the recipient from a recipient identifier associated with the verification request.

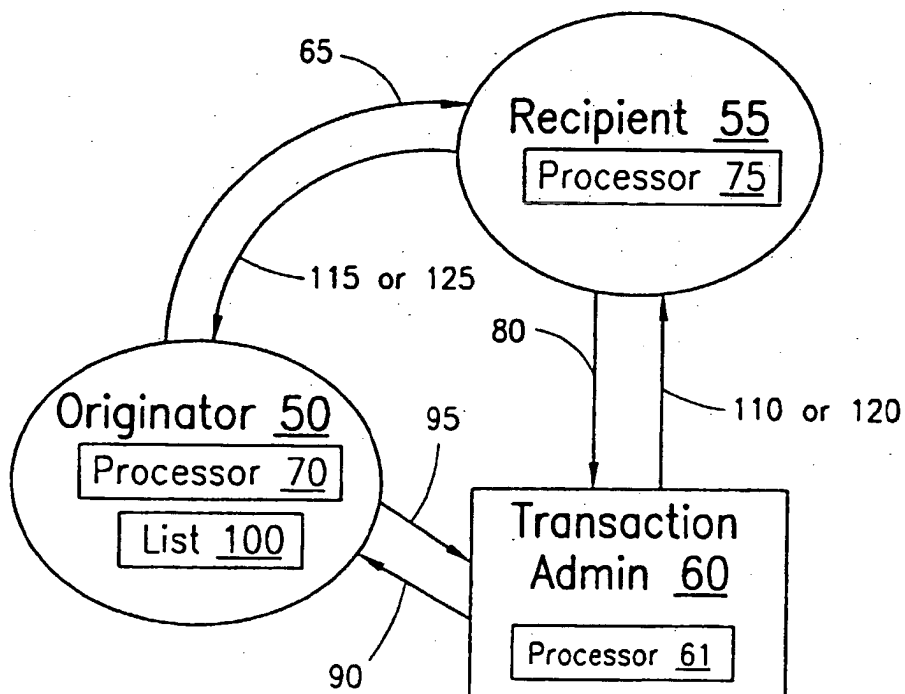
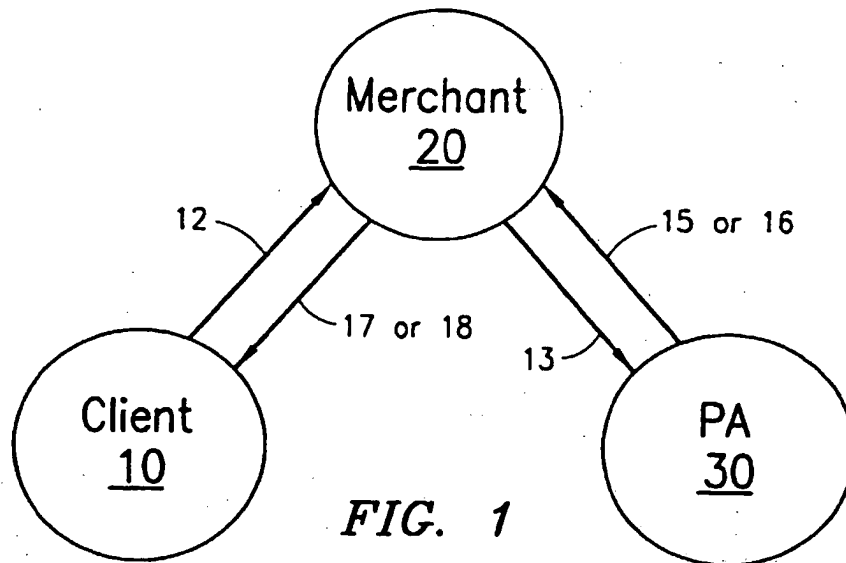
49. A system as claimed in any of claims 34 to 48 30  
wherein the third processing means verifies the transaction by using transaction data associated with the transaction.

50. A system administrator for managing transactions between an originator and a recipient comprising: 35

means for receiving a verification request from 40  
a transaction recipient; and  
means for securely communicating information with a transaction originator to validate the transaction based upon a transaction identifier 45  
included in the transaction.

51. A method of validating an electronic transaction between an originator and a recipient comprising the steps of: 50

generating an electronic transaction, including a transaction identifier, at the originator; transmitting the transaction to the recipient; verifying the transaction; and 55  
communicating information between the originator and the transaction administrator to validate the transaction.



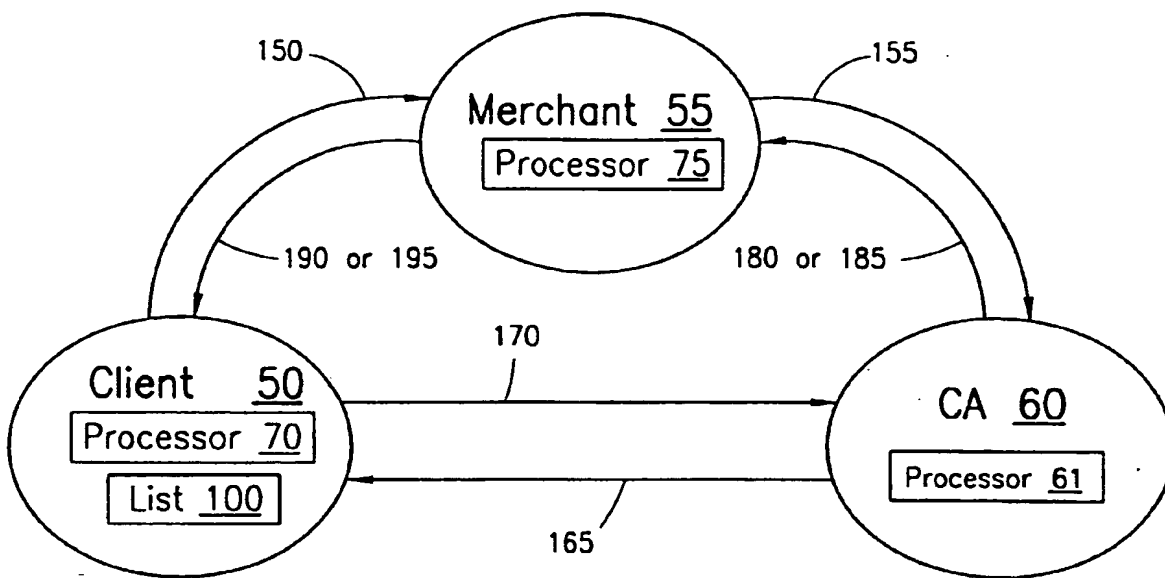


FIG. 5

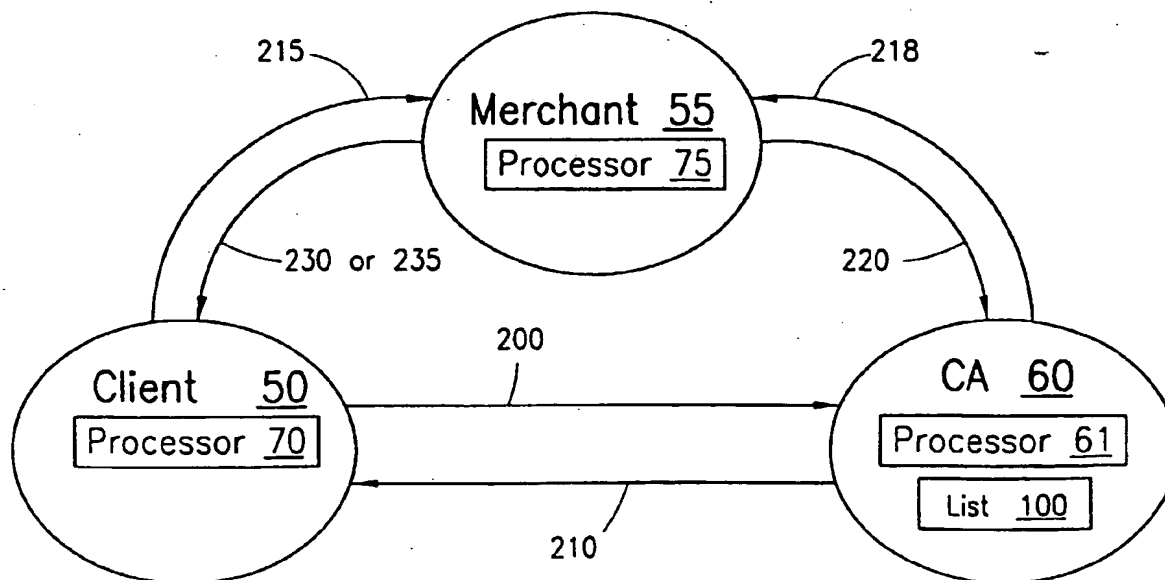
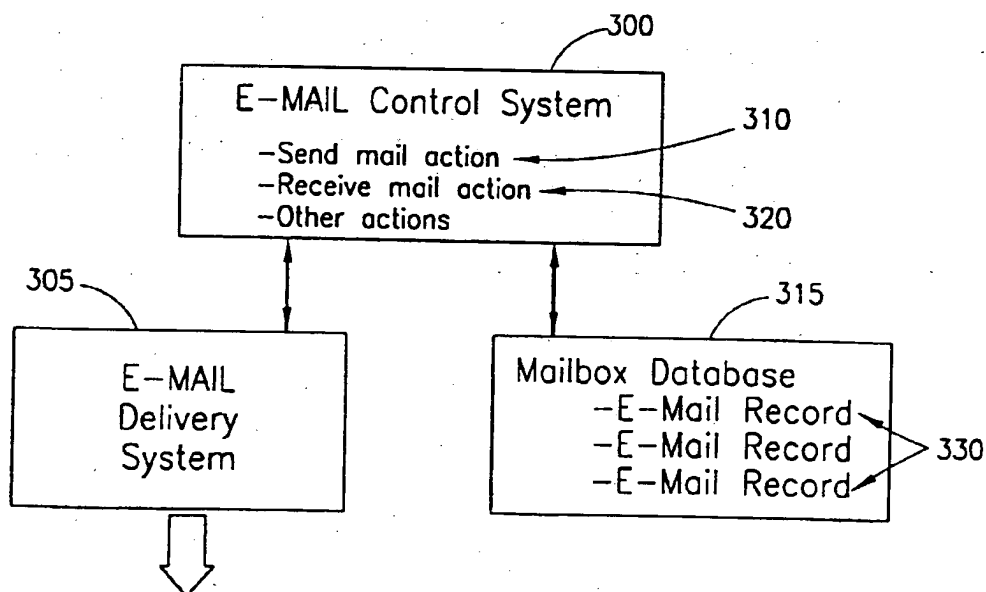
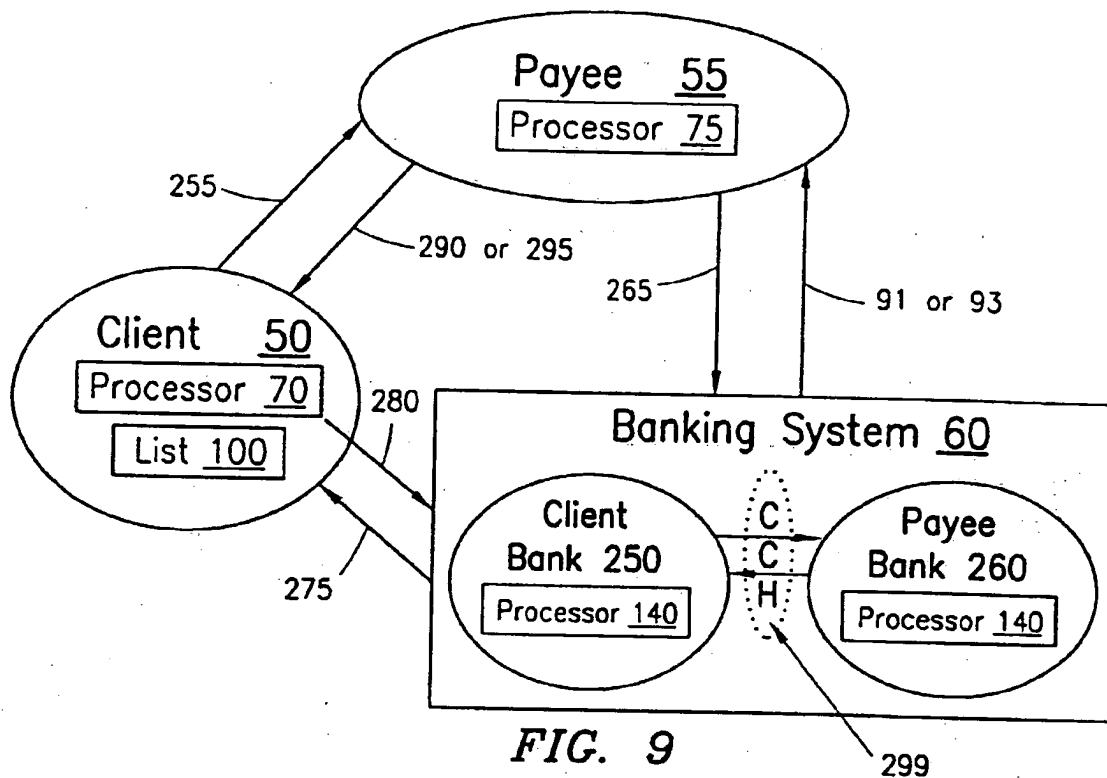


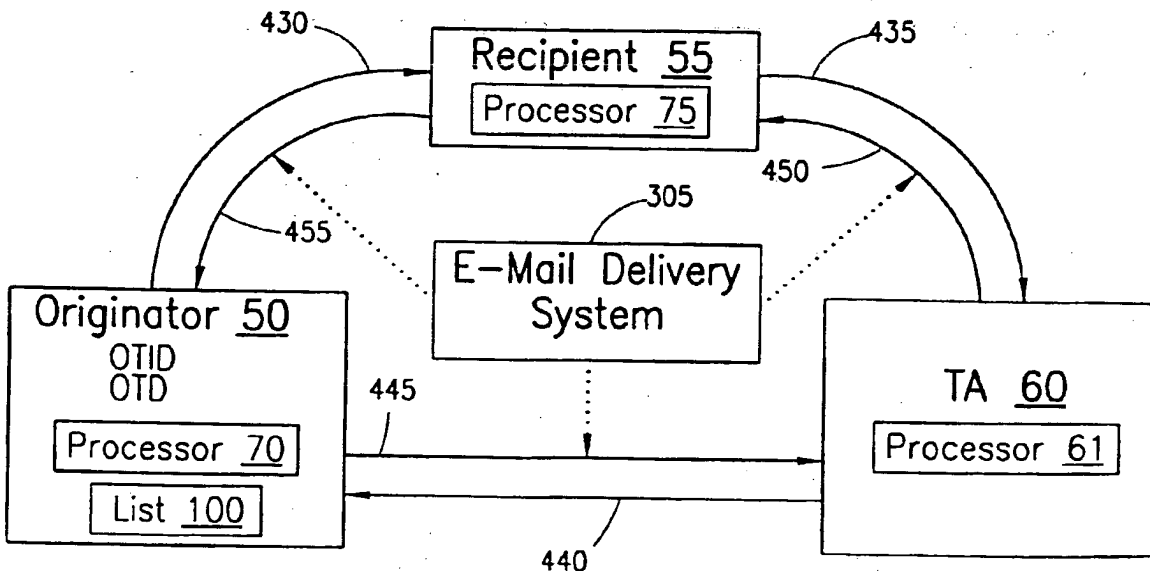
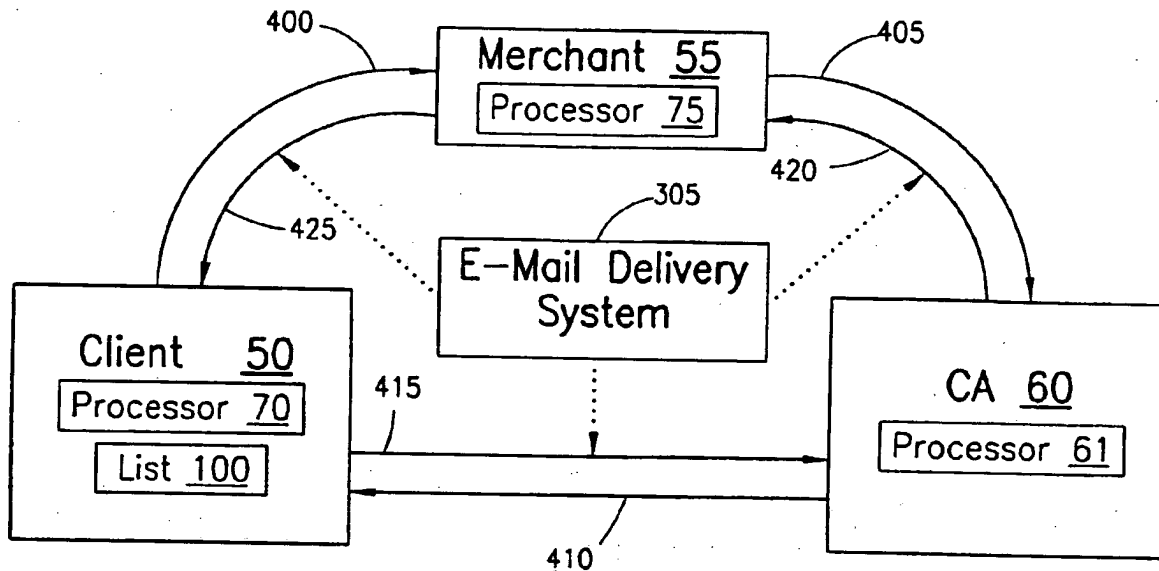
FIG. 7





Message ID	Mail Type	To	Subject	Mail Contents
Unique Global Transaction ID	1-Outbox 2-Inbox 3-SentItem 4-Transaction	Recipient Addresses		Notes and Attachments
<u>331</u>	<u>335</u>	<u>340</u>	<u>345</u>	<u>348</u>

*FIG. 12*



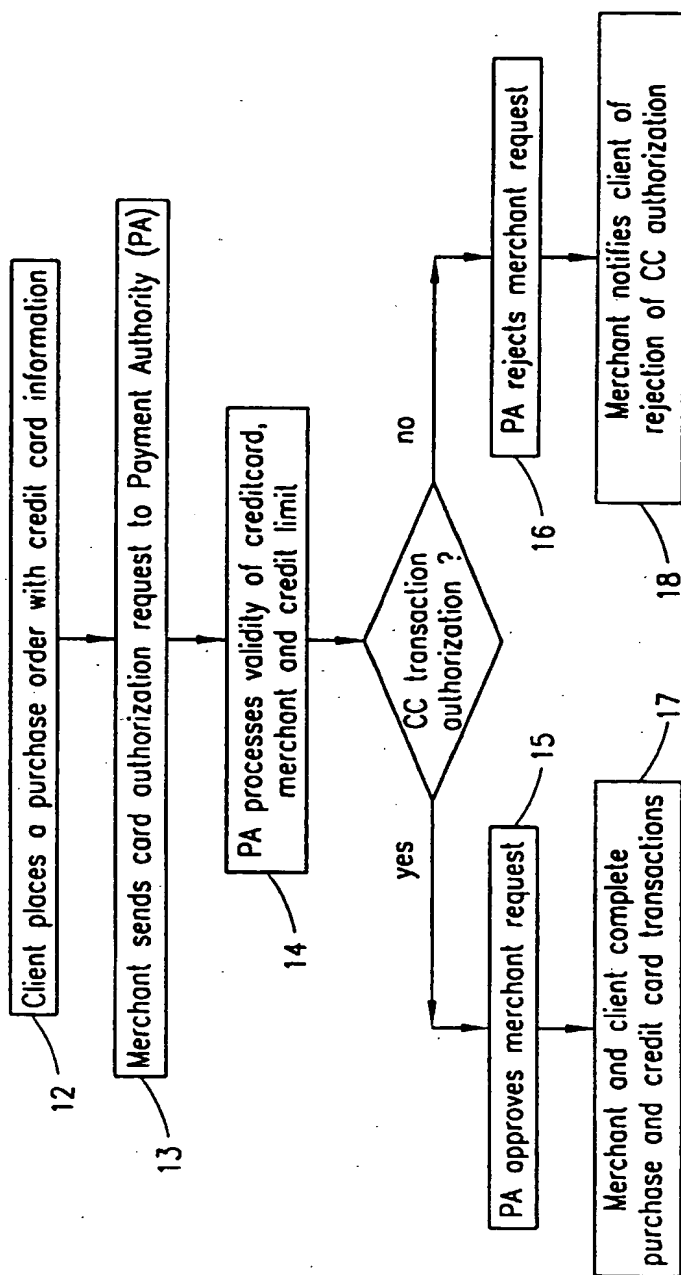


FIG. 2

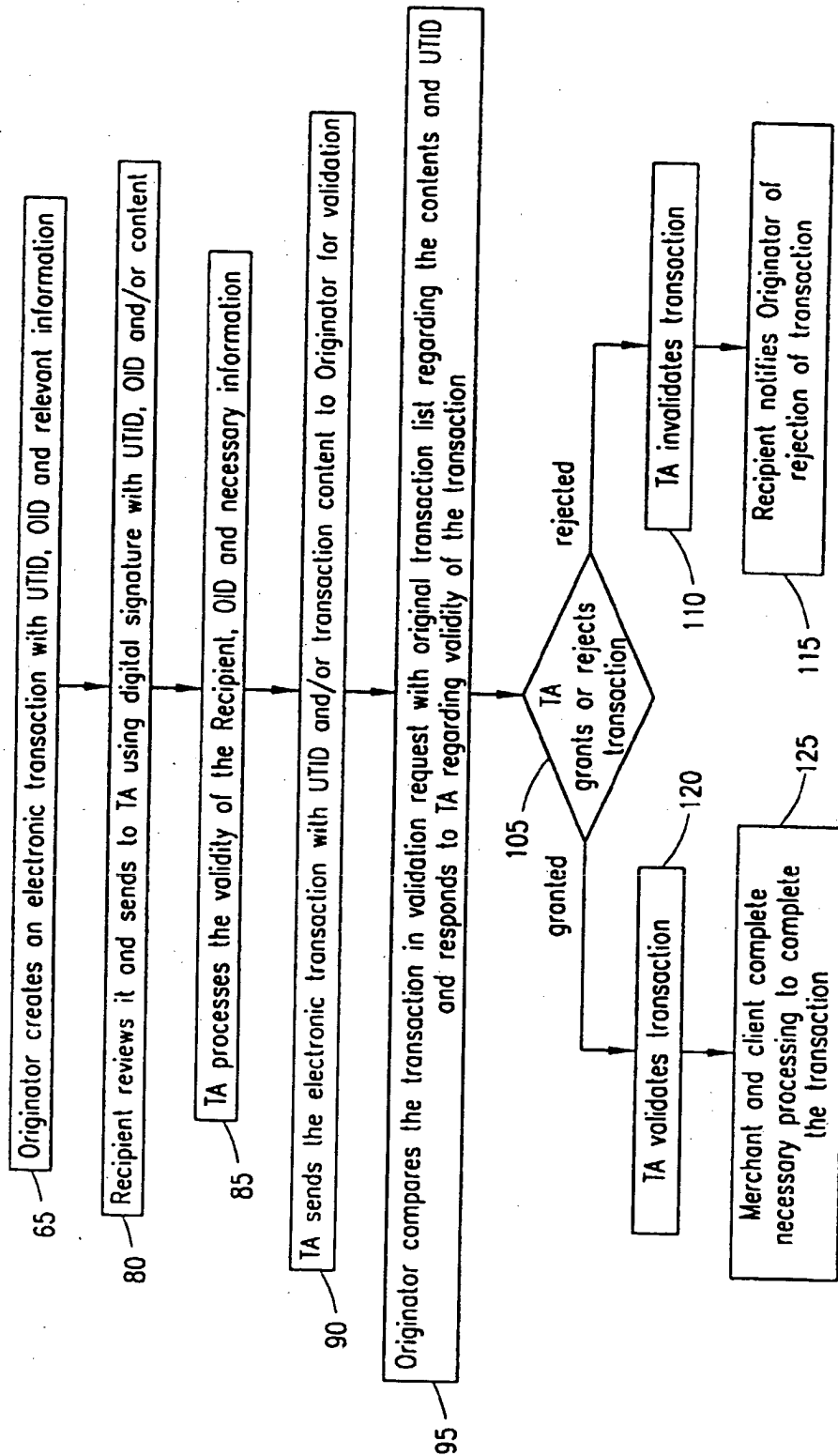


FIG. 4

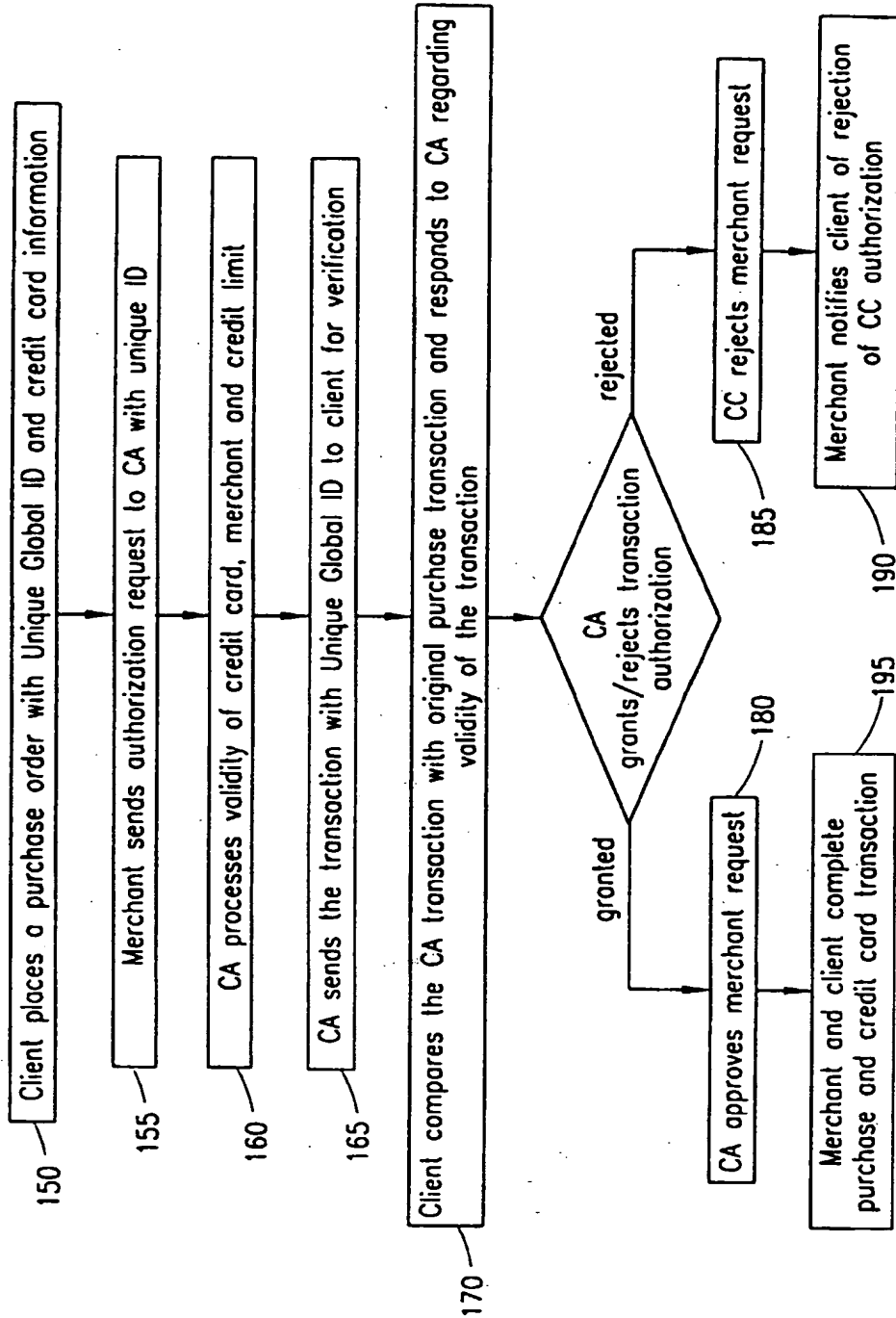


FIG. 6

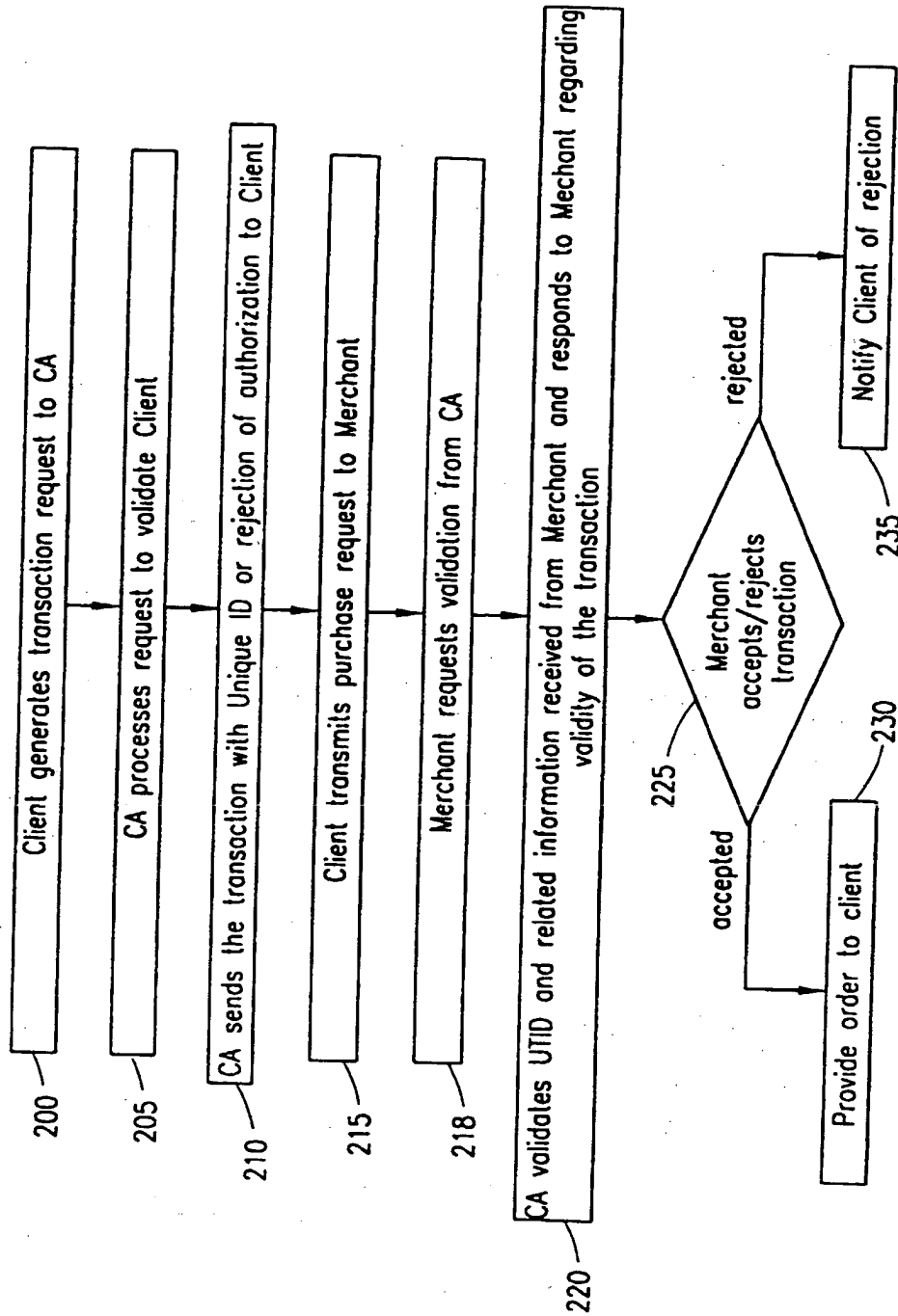


FIG. 8

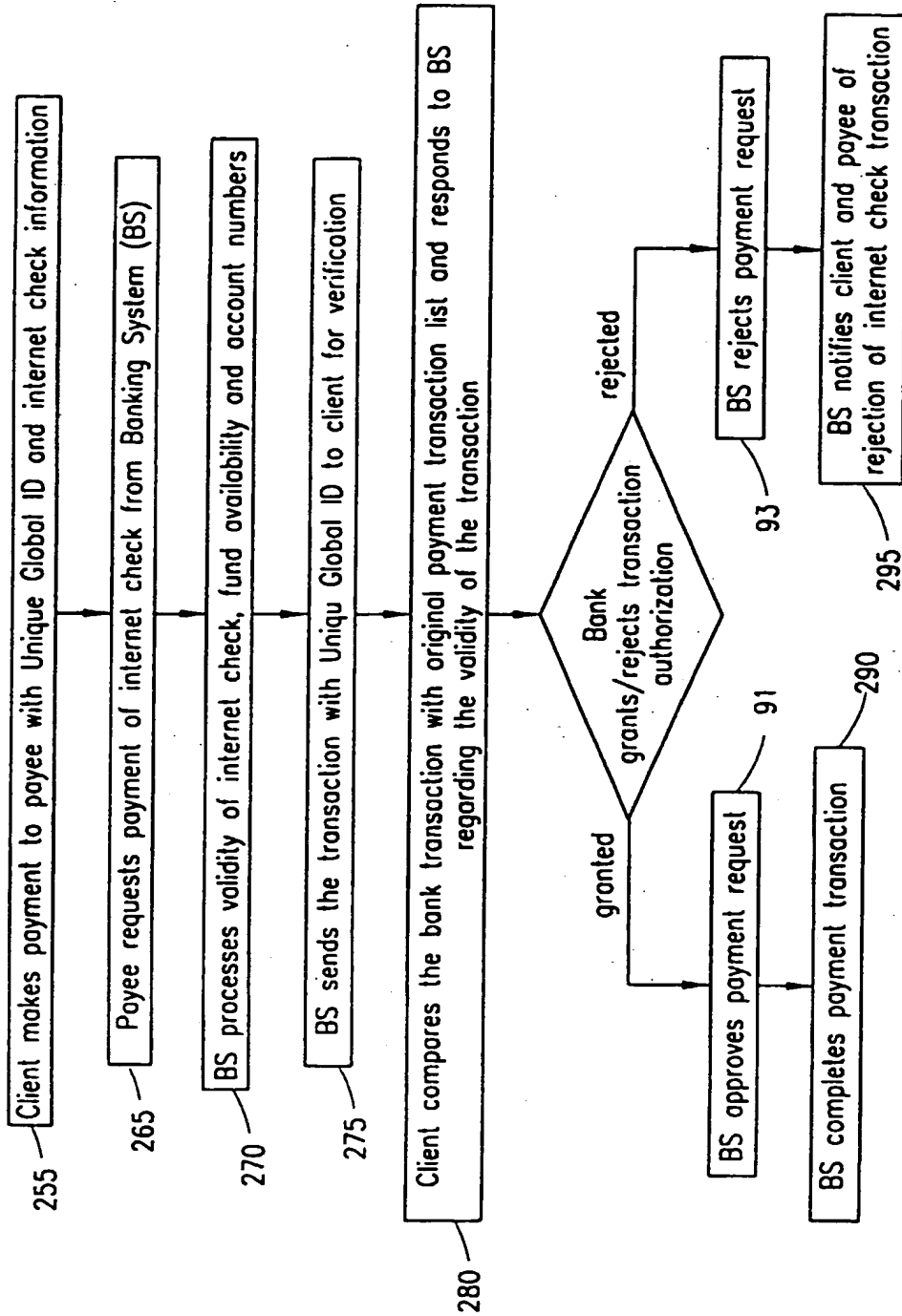


FIG. 10

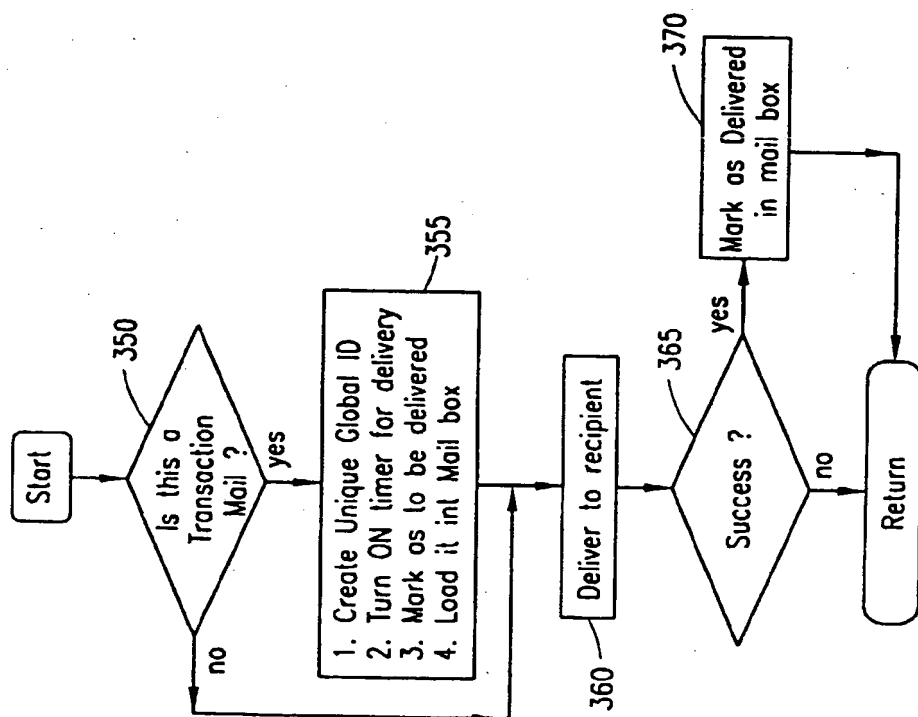


FIG. 13

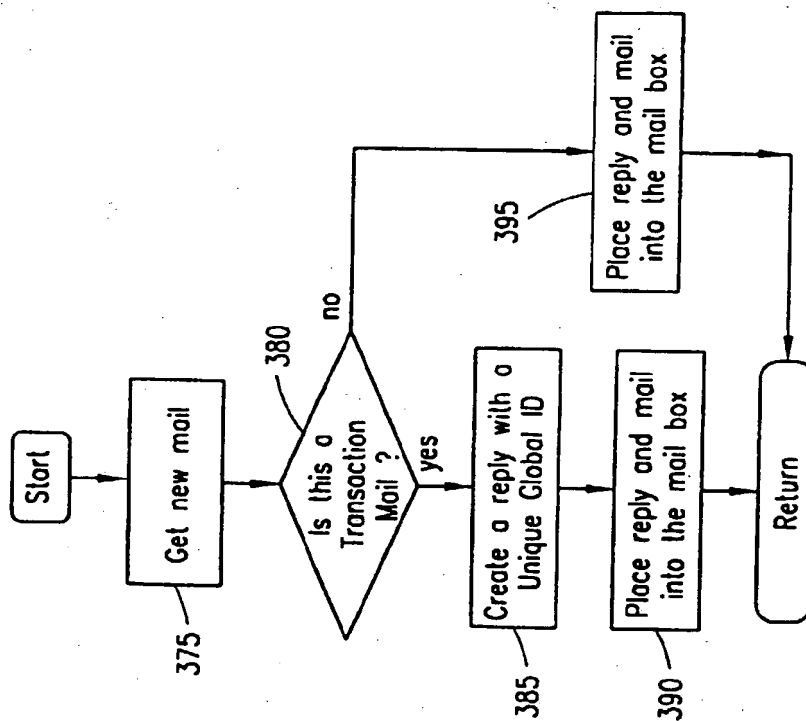


FIG. 14





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 99 30 0865

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 98 40809 A (CHA TECHNOLOGIES INC) 17 September 1998 (1998-09-17)	1-8, 10-12, 17-25, 31-40, 50,51	G07F19/00
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A	WO 94 12954 A (WILSON SHEILA) 9 June 1994 (1994-06-09)		
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			G07F G06F
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>8 October 1999</b>	Examiner <b>Guivol, O</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 30 0865

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The members are as contained in the European Patent Office EDP file on  
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08-10-1999

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